

Exercise sheet 2

Exercise 1 – hv-drawings preserving the embedding

Let $T = (V, E)$ be a binary tree with n nodes. Based on the lecture, the number of **different** hv-drawings for T is exponential, while there exists a $O(n^2)$ algorithm to compute an optimal one. The described approach may change the embedding of T , since left and right subtrees may be swapped.

Consider hv-drawings of T where the embedding is preserved, that is, the left subtree of a vertex v is placed below v and the right subtree to the right of v . Prove that the number of different hv-drawings remains exponential even if the embedding is preserved.

4 Points

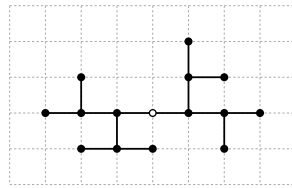
Exercise 2 – hv-drawings of paths

Compute the number of different hv-drawings of a path P on n vertices.

2 Points

Exercise 3 – Unit-length hv-drawings

Let T be a complete binary tree of height h . An hv-drawing of T is *unit-length* if the length of all edges of T in the drawing are equal to 1. For example, if $h = 3$, a unit-length hv-drawing of T is shown in the following figure.



a) Compute a unit-length hv-drawing of T for $h = 4$.

2 Points

b) Prove that unit-length hv-drawings do not exist for $h \geq 5$.

6 Points

Due by: Thursday, November 3 by 6pm.
